

CLAIMS

What Is Claimed Is:

1. A semiconductor device comprising:
a substrate;
a top inter-metal dielectric layer on said substrate;
at least two top metal lines in said top inter-metal dielectric layer;
a fuse on said top inter-metal dielectric layer, said fuse in electrical communication with at least one of said at least two top metal lines; and
a protective layer on said fuse.
2. A semiconductor device according to claim 1, wherein said protective layer on said fuse comprises a dielectric layer.
3. A semiconductor device according to claim 2, wherein said dielectric layer comprises silicon dioxide.
4. A semiconductor device according to claim 1, wherein said fuse comprises an aluminum fuse.
5. A semiconductor device according to claim 1, wherein said at least two top metal lines comprises copper.

6. A semiconductor device comprising an interconnected metallization structure comprising copper and a low dielectric material surrounding the structure, and a fuse comprising aluminum connected to the structure.

7. The semiconductor device as set forth in claim 6 further comprising a dielectric layer overlying the fuse.

8. The semiconductor device as set forth in claim 7 wherein the dielectric layer comprises silicon dioxide.

9. The semiconductor device as set forth in claim 6 wherein the structure includes a first metal layer and a topmost metal layer and further comprising an inter-metal dielectric layer comprising a low dielectric constant material interposed between the first metal layer and a second metal layer of the structure.

10. The semiconductor device as set forth in claim 9 further comprising an etch stop layer on each of face of the inter-metal dielectric layer.

11. The semiconductor device as set forth in claim 9 further comprising a plug extending between the first metal layer and the topmost metal layer of the structure.

12. The semiconductor device as set forth in claim 6 wherein the aluminum fuse has a thickness ranging from 1000-7000 angstroms.

13. The semiconductor device as set forth in claim 9 wherein the topmost metal layer of the structure has a thickness of at least 8000 angstroms.

14. A semiconductor device including a fuse comprising a first layer comprising a copper island and a second layer overlying the first layer, and wherein the second layer comprises aluminum.

15. The semiconductor device as set forth in claim 14 further comprising a dielectric layer overlying the fuse.

16. The semiconductor device as set forth in claim 15 wherein the dielectric layer comprises silicon dioxide.

17. The semiconductor device as set forth in claim 14 further includes a first metal layer and a topmost metal layer and further comprising an inter-metal dielectric layer comprising a low dielectric material interposed between the first metal layer and the topmost metal layer.

18. The semiconductor device as set forth in claim 17 further comprising an etch stop layer on each face of the inter-metal dielectric layer.

19. The semiconductor device as set forth in claim 17 further comprising a first passivation layer overlying the topmost metal layer.

20. The semiconductor device as set forth in claim 17 further comprising a plug extending among each second metal layer.

21. A semiconductor device as set forth in claim 19 further comprising a fuse window formed through the passivation layer down to the fuse passivation layer overlying the fuse.

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22. A method of blowing a fuse in a semiconductor device including at least a first metallization layer comprising copper and a fuse connected to the first metallization layer, and wherein the fuse comprises aluminum, comprising: directing a laser beam onto the fuse using a wavelength ranging from 300-500 or 1000-1400 nm.

23. The method as set forth in claim 22 wherein the semiconductor device further includes a fuse passivation layer overlying the fuse.

24. The method as set forth in claim 22 wherein the fuse passivation layer comprises silicon dioxide.

25. The method as set forth in claim 22 wherein the fuse comprises a first layer comprising aluminum.

26. The method as set forth in claim 22 wherein the fuse comprises a first layer comprising a copper island and a second layer comprising aluminum.

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27. The method of blowing a fuse in a semiconductor device including at least a first metallization layer comprising copper and a fuse connected to the first metallization layer, and wherein the fuse comprises aluminum, comprising: directing a laser beam onto the fuse using a wavelength ranging from 300-500 or 1000-1400 nm.